
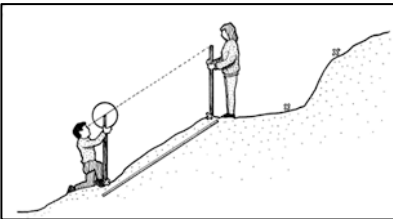

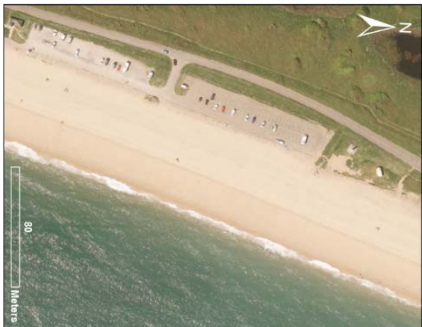


# The Dynamic Coast...

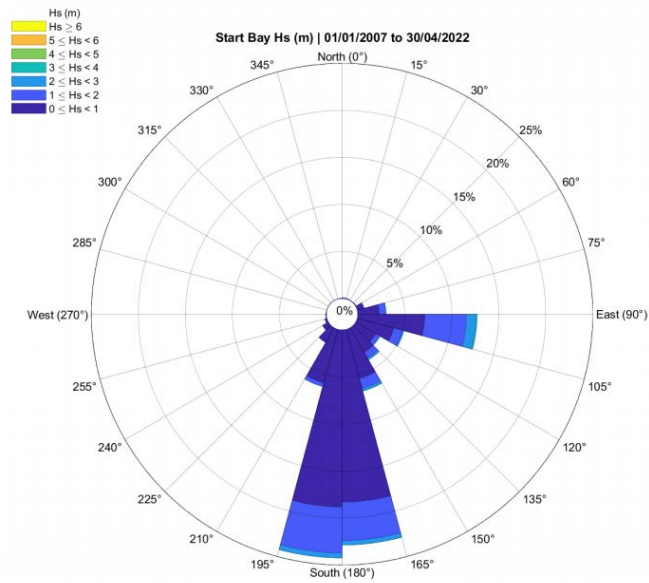
## Start Bay: the dynamic sediment cell

The destruction of the village of Hallsands in 1917 shows the importance of observing, measuring, and understanding coastal processes. This includes monitoring waves, tidal currents, and the movement of sediment. Complete the right-hand column in the table below. For each method, describe what it measures and how the information helps to understand coastal processes.

Monitoring method	Description
<p><b>Buoy</b></p> 	
<p><b>Beach profiling</b></p>  <p>(Source: <a href="#">here</a>)</p>	
<p><b>Bathymetry</b></p> 	
<p><b>Aerial photos</b></p> 	

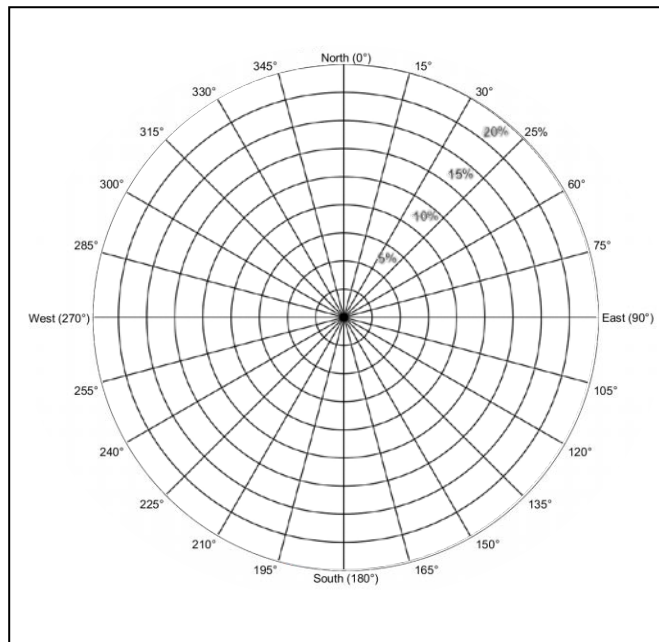


1. Buoys monitor the direction and height of waves. This information can be used to construct a **wave rose**.



(a) Use the data in the table below to complete the simple wave direction rose alongside.

Wave direction (degrees)	Occurrence (%)
90-105	15
105-120	6
120-135	4
135-150	8
150-165	10
165-180	23
180-195	19
195-210	15



(b) Using your completed graph, describe the pattern of wave direction.

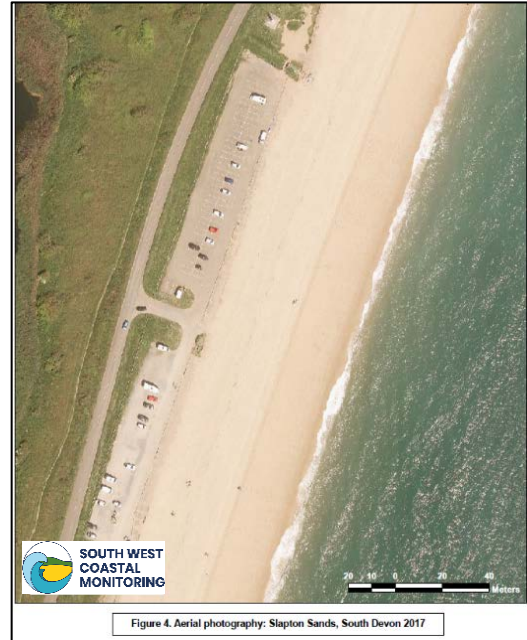
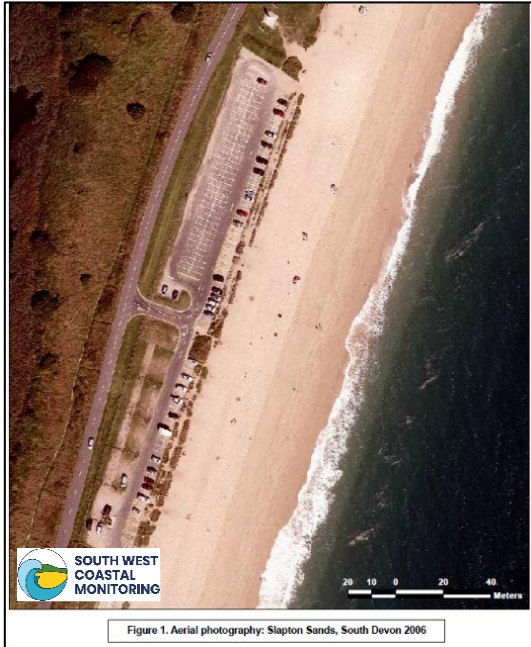
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2. The two aerial photos below show the beach and one of the car parks at Slapton Sands. Notice that the photo on the left was taken in 2006. The photo on the right was taken in 2017. Both photos were taken at low tide.



(a) Why do you think it was important that the photos were both taken at low tide?

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(b) Use the scale bar to compare the width of the beach. Take three measurements at different locations along the beach to enable you to calculate an average. Make sure each measurement is taken at the same place on each photo.

Location	Beach width, 2006 (m)	Beach width, 2017 (m)
1		
2		
3		
Average beach width (m)		

(c) Has the beach at Slapton Sands become wider or narrower? \_\_\_\_\_

(d) What does your answer to (c) suggest about sediment movement in this part of Start Bay?

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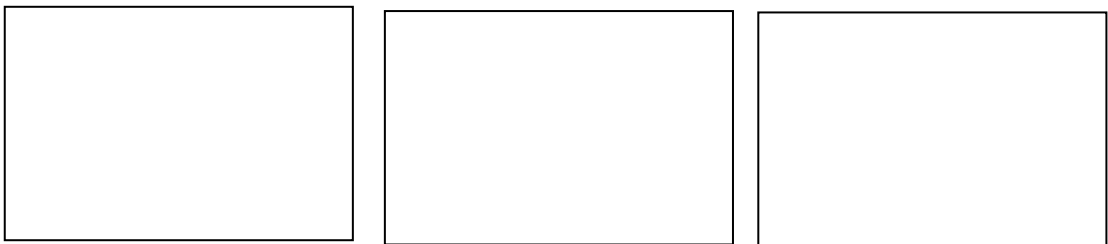


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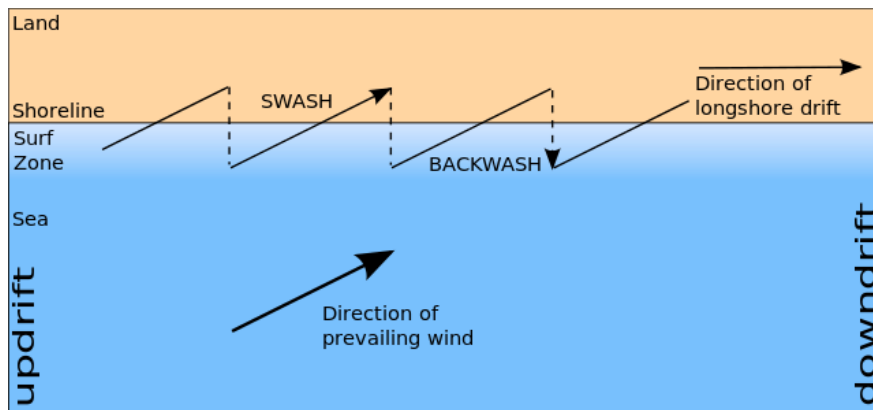


3. Scientists believe that the extensive beach in Start Bay is an example of a **barrier beach**.
- At the end of the last ice age, about 5,000 years ago, the melting ice caused sea level to rise.
  - As the sea level rose, the waves bulldozed flinty sediment that had accumulated on the sea floor towards the land.
  - This sediment rolled onshore to form today's extensive shingle beach in Start Bay.

Draw a series of three labelled diagrams to describe the formation of Start Bay's barrier beach.



4. Most of the time, southerly winds transport sediment from south to north in Start Bay. This type of transportation is known as **longshore drift**.



- (a) Use two colours to distinguish between swash and backwash
- (b) Add the next backwash arrow onto the diagram.
- (c) If north is 'straight up' on the diagram, in what direction is longshore drift? \_\_\_\_\_
- (d) Describe how longshore drift transports sediment along the beach.

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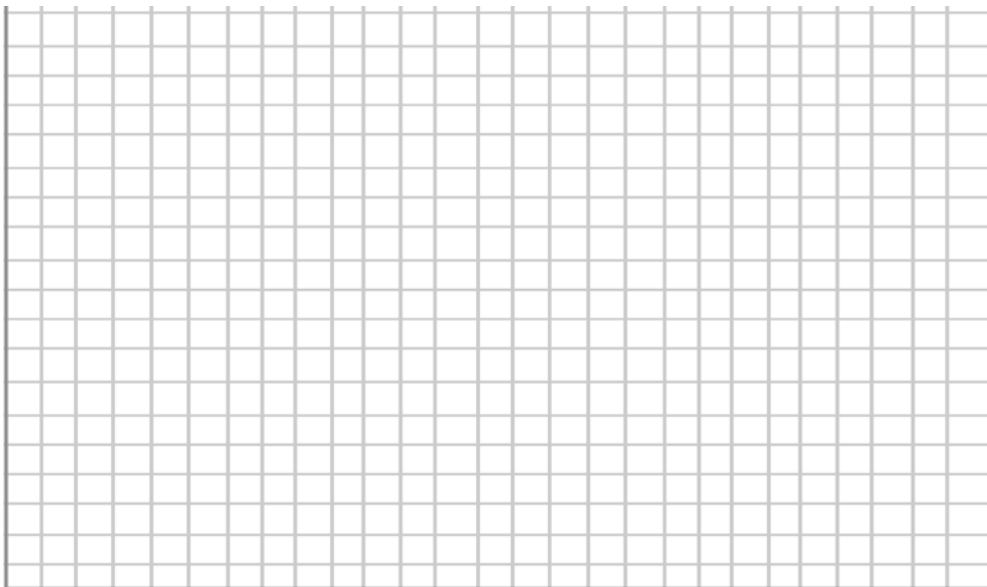
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5. A student collected 30 pebbles at three locations at Slapton Sands. Pebbles were selected close to the high tide line so that they could be compared.

Location	Pebble Size (mm)					Average Pebble Size (mm)
	1-10	11-20	21-30	31-40	41-50	
South	0	7		10	5	29.4
Middle	0	10		5	3	25.6
North	6		4	1	0	14.9



- (a) Complete the blank boxes in the table.
- (b) Use the graph paper below (or a separate sheet if you prefer) to draw one or more graphs to compare the pebble sizes at the three locations.



- (c) Using data in the table, describe the change in sediment size at Slapton Sands.

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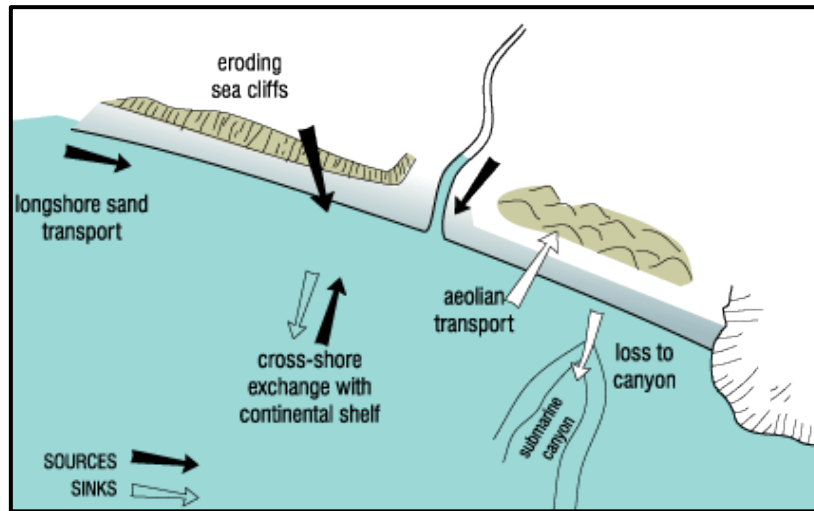
Look at Slide 10 in the PowerPoint presentation.

- (d) Are the results as expected? \_\_\_\_\_
- (e) Explain why pebble size changes along the beach at Slapton Sands.

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6. The sediment cell describes the distribution and movement of sediment in an enclosed bay.



(Source: [here](#))

- (a) On the diagram, locate and label the headland.
- (b) On the diagram, locate and label the 'sand dunes'.
- (c) How is sediment transported to the sand dunes (you may need to look up the word 'aeolian')? \_\_\_\_\_
- (d) Draw a circle around the arrow showing longshore drift.
- (e) On the diagram, locate and label 'sediment carried by rivers'.
- (f) Apart from sand dunes, give two long-term sediment sinks.  
 1 \_\_\_\_\_ 2 \_\_\_\_\_
- (g) Imagine that a seawall was constructed to prevent further erosion of the cliffs. Suggest how this action might affect the sediment cell.

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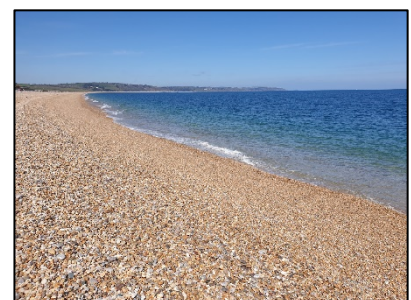
(h) Explain why understanding the sediment cell is important in managing the coast.

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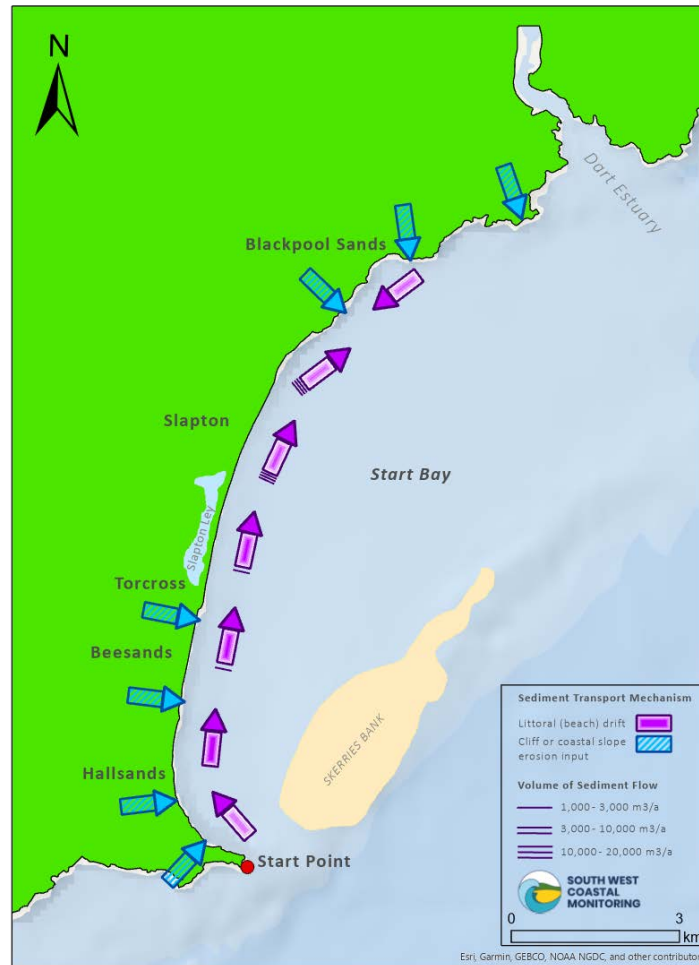
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(Source: [here](#))

7. The diagram below shows the sediment cell in Start Bay



*('Littoral' drift is the same as longshore drift)*

(a) Locate Slapton. Describe the movement of sediment at Slapton.

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(b) What is the volume of sediment flow at Slapton? \_\_\_\_\_ m<sup>3</sup>/annum

(c) What is the main sediment source south of Torcross? \_\_\_\_\_

(d) What is the name of the large offshore sediment sink? \_\_\_\_\_

(e) For Start Bay as a whole, what is the dominant direction of sediment transfer? \_\_\_\_\_

(f) The photo shows Start Point and the southern end of Start Bay. Use labelled arrows to show:

Worksheet 4

- Cliff erosion (sediment source)
- Northerly direction of littoral (longshore) drift
- Beach



(Source: [here](#))

8. Locate Blackpool Sands on the Start Bay sediment cell diagram (from Activity 7). Notice that it is located at the northern end of Start Bay. The aerial photos below show the beach in 2006 and 2017.



Figure 1. Aerial photography: Blackpool Sands, South Devon 2006

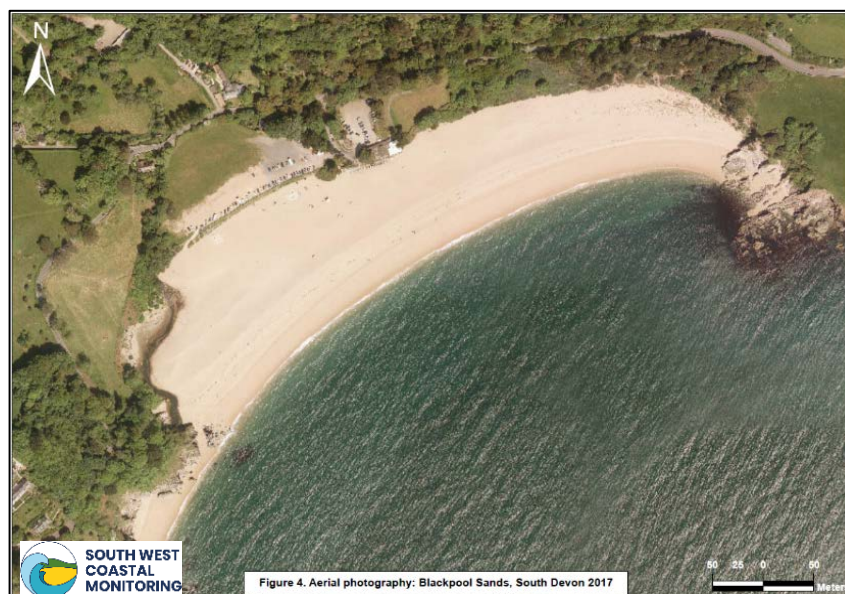


Figure 4. Aerial photography: Blackpool Sands, South Devon 2017





Worksheet 4

(a) Describe how the beach at Blackpool Sands changed between 2006 and 2017. Use the scale to include beach measurements in your answer.

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(b) Using the Start Bay sediment cell diagram, suggest reasons for the change you have described.

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